

Next In Line

Name _____

The sequence 3, 4.5, 6, 7.5, 9, ... was formed by adding 1.5 to each term to get the next term. Any two consecutive terms in this sequence differ by 1.5.
($4.5 - 3 = 1.5$, $6 - 4.5 = 1.5$).

In a sequence, if consecutive terms differ by the same amount, the sequence is called an **arithmetic sequence**. This sequence could be generated on the calculator by entering:

1.5 $\boxed{+}$ $\boxed{+}$ 3 $\boxed{=}$ $\boxed{=}$ $\boxed{=}$. . .

The sequence 4, 8, 16, 32, 64, . . . was formed by multiplying each term by 2 to get the next term. Any two consecutive terms in this sequence have the same ratio of 2
($8/4 = 2$, $16/8 = 2$, $32/16 = 2$).

In a sequence, if consecutive terms have a common ratio, the sequence is called a **geometric sequence**. This sequence could be generated on the calculator by entering:

2 $\boxed{\times}$ $\boxed{\times}$ 4 $\boxed{=}$ $\boxed{=}$ $\boxed{=}$. . .

Use your calculator to determine if the following sequences are arithmetic or geometric or neither. Give the next 3 terms for each.

- 1, 2.5, 4, 5.5, _____, _____, _____, . . .
- 0.55, 0.8, 1.05, 1.3, _____, _____, _____, . . .
- 15, 14.25, 13.5, 12.75, _____, _____, _____, . . .
- 256, 128, 64, 32, _____, _____, _____, . . .
- 3, 7, 15, 31, _____, _____, _____, . . .
- 3, 9, 27, 81, _____, _____, _____, . . .
- 3, 64, 6, 32, 9, 16, 12, _____, _____, _____, . . .
- Use your calculator to generate an arithmetic sequence that starts with 1.5.
List at least 4 terms in the sequence.
1.5, _____, _____, _____, _____, . . .
- Use your calculator to generate a geometric sequence that starts with 4.
List at least 4 terms in the sequence.
4, _____, _____, _____, _____, . . .

Thinking Cap

36 is the fifth term of an arithmetic sequence and 56 is the ninth term of the same sequence. What is the first term of the sequence?

TEACHER NOTES: *Next In Line*

Objective: To classify sequences and generate additional terms.

Grade Level: 4-6

Topic: *Patterns/Problem Solving*

Using the Activity:

In this activity, students will use the automatic constant for +, -, and x to generate additional terms in a sequence and will classify the sequence as arithmetic, geometric, or neither. *Arithmetic sequences* have a common difference between consecutive terms. In generating the sequence on the calculator using the automatic constant for addition you would enter: **the value of the common difference** $\boxed{+} \boxed{+}$ **first term in the sequence** $\boxed{=}\boxed{=}\boxed{=}$. Note, if the sequence is descending, going from higher values to lower values, but still arithmetic you enter: **the value of the common difference** $\boxed{-}\boxed{-}$ **first term in the sequence** $\boxed{=}\boxed{=}\boxed{=}$. *Geometric sequences* have a common ratio (or quotient) between consecutive terms. In generating the sequence on the calculator using the automatic constant for multiplication you would enter: **the value of the common ratio** $\boxed{\times}\boxed{\times}$ **first term in the sequence** $\boxed{=}\boxed{=}\boxed{=}$. The value of the common ratio could be a whole number or a decimal number. If in comparing consecutive terms in a sequence, no common difference or ratio can be found, then the sequence is neither arithmetic nor geometric. Students must determine the pattern by analyzing the relationship of consecutive and non-consecutive terms in the sequence. For example in problem 1, each succeeding term is 1.5 greater than the prior term, therefore the sequence is arithmetic generated by $1.5 \boxed{+} \boxed{+} 1 \boxed{=}\boxed{=}\boxed{=}$. In problem 4, each succeeding term is $\frac{1}{2}$ of the previous term, hence the sequence is geometric generated by $.5 \boxed{\times}\boxed{\times} 256 \boxed{=}\boxed{=}\boxed{=}$. In problem 5, there is no common difference or ratio. The difference between the terms changes from 4 to 8 to 16, suggesting the next terms is 63, a difference of 32.

Answers: 1. arithmetic, 7, 8.5, 10 2. arithmetic, 1.55, 1.8, 2.05

3. arithmetic, 12, 11.25, 10.5 4. geometric, 16, 8, 4 5. neither, 63, 191, 447

6. geometric, 243, 729, 2187 7. neither, 8, 15, 4 8. and 9. answers will vary

Thinking Cap

This section explores relationships in an arithmetic sequence. To get from the 5th term to the 9th term the same number would have been added 4 times. The difference between the 2 terms is 20. Dividing 20 by 4 gives the constant difference of 5. Starting by subtracting 5 from 36 and working backwards, gives a first term of 16.